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MARCH 2009

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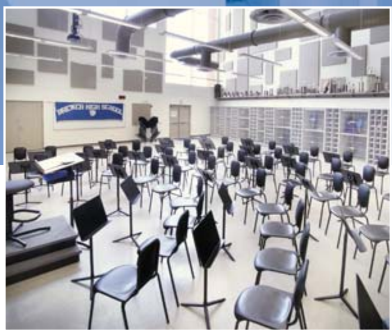
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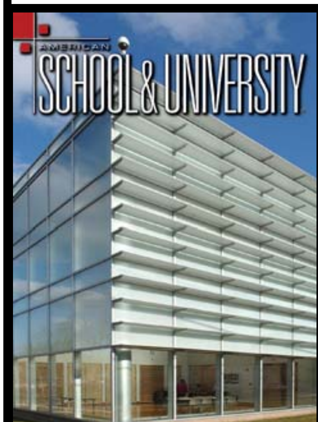
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On the Cover: Yale University's Rose Center, New Haven, Conn., is home to the campus police department and the Dixwell-Yale University Community Learning Center; Architect: William Rawn Photographer: Michael Marsland/Yale University

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Bucks for Bonds



Tucked away in the recently enacted economic stimulus bill is a potential boon for school construction: $25 billion in zero-interest school construction bonds that could save education institutions billions of dollars in interest payments and provide incentive for increased school construction.

The provision, part of the American Recovery and Reinvestment Act of 2009, makes available over two years $25 billion in tax credits to bond holders for the interest normally paid on school construction bonds. This permits education institutions to pay back only the principal. The money saved by not paying interest can be directed toward other education needs.

First introduced in Congress more than a decade ago, the America's Better Classrooms Act (which the zero-interest bond program was called prior to being included in the final stimulus bill) has been advocated by House and Senate Democrats for some time. As part of the historic economic stimulus package recently passed, it finally has come to fruition.

The tax credit enables state and local governments to issue up to $22 billion in Qualified School Construction Bonds ($11 billion this year and $11 billion in 2010). It also increases funding by $2.8 billion ($1.4 billion this year and $1.4 billion in 2010) for the existing Qualified Zone Academy Bonds program. Bond proceeds can be used for the construction, modernization, upgrade and repair of public school facilities, as well as the acquisition of land for the new construction.

As education institutions continue to try to meet the growing need of rebuilding, improving and adding to their infrastructure, the tax credits will make school construction bonds more attractive to investors—and make construction projects more affordable for schools. ■



jagron@asumag.com

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WEB 101

To close or not to close?

A recent discussion about school closing because of weather sparked some great discussion on Schoolhouse Beat—The Blog:

•"I don't think we close too frequently. We have administrators driving the roads in the early hours to check conditions."

•"Given the number of parents who work, it is imperative that school be called off only in the most dire weather circumstances."

•"As a former Midwesterner myself who has lived in a major Mid-Atlantic city for nearly 30 years, I remain astonished at how crippling normal winter weather is in the Mid-Atlantic, weather that would be taken in stride in other parts of the country. In the Midwest, the attitude is, the show must go on—everything that needs to be done must still be done, regardless of weather, so it does."

•"I made school closing decisions for nine years, and one thing I learned was that you can't win—open or close. Community expectations play a part."

To read more comments or to add your own, visit our blog at http://blog.asumag.com/schoolhouse_beat.—*Susan Lustig*



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– Nada Napoletan Rutka, CMG
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INSIDE: TRANSPORTATION



BADGES ON BUSES

The Shawnee Mission (Kan.) school district has begun a program to combat the growing problem of motorists not stopping when they see school bus stop arms. Together with its bus-service provider, the district and local police departments have initiated the Badges on Buses program.

Kansas law says that a driver of a vehicle meeting or overtaking a school bus stopped on the road must stop when the bus' red lights are flashing. The district's bus drivers help police identify the areas with the greatest violations, and officers ride along on routes in those parts of the district. When officers witness a vehicle that ignores the bus' stop arm and flashing lights, they radio to a patrol car waiting nearby, and the driver is issued a citation.

"This program is vital to the safety of our students," said Ron Roe, manager of purchasing for the district. "We need to raise awareness so that drivers stop when buses stop."

Because of the increase in this type of traffic violation, state lawmakers increased the fine to $300 from $100, the district says.

CLEANER BUSES FOR 8 IOWA DISTRICTS

Eight school districts in Iowa will receive matching grants from the state's Bus Emissions Education Program (BEEP) to buy new diesel school buses. Each district will receive $30,450 for a new bus. The new vehicles will replace buses manufactured between 1981 and 1992.

The districts: Camanche Community Schools; Independence Community School District; West Hancock Community Schools; Southeast Webster-Grand Community School District; Western Dubuque County Community School District; George-Little Rock Community School District; Cardinal Community School District; and Creston Community School District.

To receive a grant, districts are required to enforce an idling-reduction policy, demonstrate need, and discuss their efforts to reduce pollution at their facilities. The new buses they will purchase must at least meet the U.S. Environmental Protection Agency's (EPA) 2007 engine standards for environmental controls and safety standards. New buses emit 95 percent less pollution than the old bus engines the school districts are replacing.

HYBRID SCHOOL BUS DEBUTS IN COLORADO

The Adams 12 Five Star School District began using Colorado's first-ever hybrid school bus earlier this year.

The district was able to buy the hybrid school bus with the help of an alternative fuels rebate from the state of Colorado.

The environmental benefits of hybrid bus technology include a 70 percent increase in fuel economy and a 40 percent reduction in carbon-dioxide emissions.

The hybrid bus gets about 11.9 miles per gallon, compared with 7 miles per gallon with a traditional diesel bus.

A third-grade class from Hillcrest Elementary in Northglenn, Colo., took the hybrid bus' inaugural trip when it visited the National Center for Atmospheric Research (NCAR) in Boulder in January. ■

HOP ON THE BUS

School buses remain the dominant form of daily transportation for students.

26 million	Number of students that ride school buses each day in the United States
480,000	Number of schools buses transporting U.S. students
346.6 million	Total daily mileage saved by students riding school buses
17.3 million	Number of private vehicles that would be needed to transport students that now ride school buses
36	Average number of cars that would be needed to transport the students on one school bus
3.1 billion	Number of gallons of fuel that would be consumed if private vehicles transported students instead of school buses

Source: The American School Bus Council

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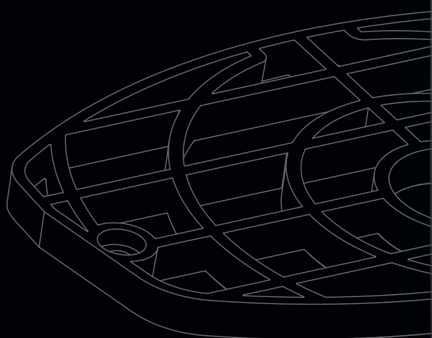
- It takes 17 million gallons of oil each year to produce those bottles
- Almost all of them end up in landfills, where they will sit for generations
- Bottled water prices are usually between 240 and 10,000 times their cost
- Most U.S. bottled water comes from the same sources as municipal supplies
- Diverting source water for bottlers' use negatively impacts municipal supplies
- The good news is people are interested in staying hydrated…

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The 44,000-square-foot dance complex at Point Park University, Pittsburgh, has received LEED-NC gold.

The three-story building features an Energy-Star-rated roof; water-saving systems; sustainable wood floors; and low-emitting paints, carpeting and other materials. Project highlights include 24 percent energy cost savings from HVAC systems and lighting, 40 percent savings with water-efficient fixtures, 85 percent of demolition and construction waste diverted from landfills, 25 percent of building materials manufactured within 500 miles, and 20 percent of materials consisting of recycled content.

The building contains five rehearsal studios and performance spaces with room for three additional studios. It features continuous air-quality monitoring; lighting and temperature controls; and windows set high on bright, reflective interior walls, allowing daylight to flood the spaces.

The Design Alliance (Pittsburgh) is the architect.



Point Park University, dance complex, Pittsburgh. Photo courtesy of Cheryl Mann Photography



Eagle Hill School, The Cultural Center at Eagle Hill, Hardwick, Mass.
Photo courtesy of Bruce Martin

Cultural destination

The Eagle Hill School, Hardwick, Mass., has a new facility that will make it a destination for premier performances.

The Cultural Center at Eagle Hill houses the Abby Theatre, a 457-seat proscenium theater that features high-end acoustical sound and stage communication systems, a green room and dressing rooms for performers, a cinema-quality projection system, wireless microphones, and a steeply raked house that enables patrons to become part of the performance.

Among other performance areas, the Kresge Studio Theatre stands out as a flexible space that uses portable risers, an overhead grid theatrical lighting system, and a catwalk system on all walls that can be used for technical and theatrical purposes.

The 43,000-square-foot cultural center also includes a 500-seat dining and function hall, art exhibition spaces, classrooms and computer labs for visual and graphic arts, a music classroom and recording studio, a 2,000-square-foot woodshop, 900 square feet of art studio space, reception areas, and an outdoor patio and amphitheater.

The architect is Lamoureux Pagano Associates, Architects (Worcester, Mass.). Consigli Construction Co., Inc., (Milford, Mass.) is the construction manager.

Start: August 2007
Completion: August 2008
Project area: 43,000 sq. ft.
Cost: $15 million

Upward expansion

Colorado Springs District 11 challenged architects for the Coronado High School Performing Arts Center to transform a wornout lecture hall on a restricted site into a modern performing-arts theater.

Constructed in 1972, the 350-seat lecture hall was inadequate for this 1,800-student high school. Its location, surrounded by classroom buildings, prompted an expansion upward, instead of outward.

A balcony addition more than doubles the capacity to 800 seats. Steep risers resembling stadium seating provide perfect sightlines. Upgrades include a new orchestra pit and rigging, and acoustic and lighting systems.

The green room doubles as a classroom for performing arts. A scene shop behind the stage enables students and teachers to construct sets for use during performances.

The architect is DLR Group (Colorado Springs, Colo.).



Coronado High School, Performing Arts Center, Colorado Springs, Colo. Photo courtesy of Jeff Scroggins

Arts instruction

Construction is underway on an instruction center for performing arts at Napa Valley College, Napa, Calif. The complex will include multiple spaces for music and theater department performances and instruction.

The 48,000-square-foot facility will feature a 550-seat theater; black-box theater; music recital venue; theater; choral, orchestral and piano rehearsal spaces; offices; and a scene and costume shop. It is part of the $133.8 million bond measure passed by Napa County voters in 2002 and is scheduled for completion in spring 2010.

The architect is HGA Architects and Engineers (San Francisco). ■



Crisis Communication

Repeat after me: It's okay to be redundant.



When an emergency occurs at a school or university, a vital element of the response is getting the word out. Students, staff, visitors and the community need to know whether they are in danger and what action to take: stay put, leave the campus, take shelter.

After some investigations concluded that the lack of timely campuswide notification at Virginia Tech may have contributed to the enormity of the 2007 shooting deaths there, higher-education institutions have focused greater attention on providing an effective way to notify all those connected to campus when a crisis is occurring. On a college campus, making sure a communication system actually is communicating with everybody can be a difficult goal.

Realizing that one communications avenue might not reach everybody, higher-education institutions are using systems that communicate messages in numerous ways. In most contexts, redundancy is considered inefficient; but in crisis communications, it can be vital in disseminating the message. A recent paper from the National Clearinghouse for Educational Facilities identifies about two dozen types of notification devices:

•**Cell phones:** Their widespread use helps spread messages quickly; text capabilities provide flexibility in delivering information. However, some users may have their phones turned off, and wireless transmissions may be weak or disrupted in certain parts of a campus.

•**E-mail:** A message can be distributed quickly throughout a school community, but its effectiveness depends on recipients being in a position to receive their e-mail.

•**Sirens, bells, strobe lights:** These are effective in letting people on campus know an emergency exists, but without some other information, people hearing the alarms won't know what the emergency is and how they should respond.

•**Web pages:** When a community is unsure of developments, a school's Web page can provide a consistent message, with regular updates, if needed. However, people won't see the information unless they seek out the Web page.

•**Visual electronic displays:** These are effective at disseminating information in public spaces, and campus officials know the specific areas that the message will reach.

•**TV and radio announcements:** Using these media is an effective way to get a message out to an entire community (and beyond), but the intended recipients need to know if there is a specific station or channel they should tune into for emergency information. TV and radio is not a good choice if a school is trying to deliver messages to a limited audience.

•**Other communications methods:** Call boxes with panic buttons; conventional phones; faxes; hotlines and 800 numbers; intercoms; portable loudspeakers and bullhorns; pop-up messages on computer networks; pagers; posters; public-address systems; satellite phones; security staff and runners; social networking websites; text messaging; and TTY phones for the hearing impaired. ■ *–Mike Kennedy*

NOTABLE

Less than 5 Percentage of higher-education institutions that, prior to the 2007 Virginia Tech massacre, said they included mobile phones as part of their emergency-notification system.

87 Percentage of higher-education institutions that said they conducted a review of their campus safety and security policies and procedures in the aftermath of the Virginia Tech massacre.

95 Of the institutions that conducted security reviews, the percentage whose review included an examination of emergency notification/broadcast alert systems.

Source: Midwest Higher Education Compact, "The Ripple Effect of Virginia Tech: Assessing the Nationwide Impact on Campus Safety and Security Policy and Practice," May 2008



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Yale University, Kroon Hall
New Haven, Conn.

Architect: Centerbrook Architects and Planners
Photographer: Michael Marsland/Yale University

COST CONTROL

Managing school construction expenditures in a rapidly changing environment.

BY MIKE KENNEDY

When Fayette County (Ky.) school officials began putting together estimates for upcoming renovation projects at two elementary schools, they based their projections on their district construction projects from 2007.

"The information we were getting on the construction market was that costs were continuing to inflate," says Bill Wallace, Fayette County's director of facilities design and construction.

But by February, when construction bids were opened for the renovations of Cassidy and Russell Cave elementary schools, the building market had become a different place. In this upside-down world, education institutions like Fayette County are saving millions of dollars because the bids for their construction projects are well below estimates.

"Certainly, we were pleased," says Wallace. "Cassidy was 21 percent below estimates, and Cave was 11 percent below estimates. We had more bidders than we've ever had before."

The economic recession that has dragged down the stock market, wiped out savings and put millions out of work has hurt schools and universities as well—resulting in some building projects being mothballed (see sidebar, p. 24), jobs lost and campuses targeted for closing. The grim financial climate has made it more difficult for many education institutions to acquire the funds needed for facility improvements. However, for those that have funding in place for capital improvements, the combination of declining prices for some materials and the intense competition among contractors for projects has taken the sting out of the sticker shock that often accompanies capital improvement projects. And administrators aren't about to apologize for their good timing.

Need job, will work cheap

Fayette County is able to move forward with construction because voters in 2007 approved a property tax increase. By the time bids were solicited, the district benefited from price drops for oil and other materials. At the same time, the residential construction market was stagnant, and more companies focused their attention on submitting proposals for school projects.

"There is so little construction work out there," says Wallace. "School projects are the largest portion of what is getting constructed. We've drawn back experienced contractors, and we've seen a lot of new folks, too."

Below-estimate bids are not limited to Fayette County schools. Other examples in recent months:

•The bid accepted in December for Morgan Village Middle School in Camden, N.J., was about $21 million; the cost estimate was $27.1 million.

•The winning bid in December for an elementary/middle school in the Egg Harbor City (N.J.) district was $15.2 million; the cost estimate was about $18 million.

•In Medford, Ore., the bid for renovating Lone Pine Elementary School was $700,000 less than the $12 million estimate.

•Officials in the Bismarck (N.D.) district had estimated that a new elementary school would cost $12 million, but when bids were opened in January, the low bid was $8.8 million.

•The town of Marblehead, Mass., had estimated that renovating its Village School would cost $16.3 million; the bid in February was about $11 million.

•The Mountain Home (Ark.) board accepted in February a bid of $15.3 million for a 115,000-square-foot intermediate school; the cost estimate was $17.5 million.

•The Indianola (Iowa) Community School Board approved a $1.9 million construction contract for a new athletic facility; project engineers had estimated the cost at $2.5 million.

Continued ...



Fayette Public Schools, Lexington, Ky., has had success recently with dropping construction costs. Photo courtesy of Fayette Public Schools

•The Richardson (Texas) district had estimated that a new elementary school roof would cost $1.2 million, but the winning bid came in at $895,000.

Before the recession altered the construction market, many schools and universities found it difficult to control expenses and prevent climbing costs from jeopardizing projects. But even now, when many education institutions are benefiting from the scarcity of construction work, administrators must be vigilant about managing costs and planning thoroughly to avoid budget-busting surprises.

Unique complexities

One reason schools and universities often find it difficult to predict and control construction costs is that, as the current recession has shown, factors can fluctuate greatly from year to year, institution to institution, district to district, state to state. Administrators who are better informed about the differences and how they might affect construction budgets are in a better position to anticipate additional costs.

In a 2008 report to the American Institute of Architects California Council, "The Complex and Multi-Faceted Nature of School Construction Costs: Factors Affecting California," the Center for Cities and Schools at the University of California-Berkeley noted that public schools often struggle to contain the costs of construction projects because they must provide needed classroom space even if economic conditions are unfavorable. A developer can delay or cancel a private project and wait for better times, but a school system does not have that luxury.

"School construction is driven largely by enrollment growth and needs for upgrading existing schools," the report says. "School districts must build schools whether market conditions are favorable or unfavorable."

In addition, education institutions trying to decide where to build a facility often have limited options. In the urgency to provide additional classrooms in the neighborhoods where they are needed, schools may have to pay more for a site, or choose a site that requires extensive grading, has

Massachusetts models design sharing

Because of the recession, the Massachusetts School Building Authority (MSBA) says it will have less funding to help local districts construct facilities, but the agency still hopes that the lure of state dollars will persuade districts to rein in the galloping costs of school construction.

The MSBA's Model School Program is an effort to encourage districts to spend less lavishly on new facilities and use existing designs as a prototype for new construction.

The program began after complaints were voiced about the escalating costs of a planned new high school in Newton. Newton North High School is expected to cost $195 million.

School districts that agree to take part in the Model School Program will use an existing design as the basis for building a new facility. In Norwood, the new high school's design will be modeled on Whitman-Hanson Regional High, which was completed in 2004. The MSBA says the model schools approach will trim about $26 million from the Norwood High plan.

In Wellesley, plans for a new high school were altered after the district adopted some of the elements of the Model School Program. The new campus now calls for 280,000 square feet instead of 327,000 square feet, and construction costs are projected to be $110 million instead of $159 million.

The building authority acknowledges that the model schools approach will not work with all Massachusetts projects, but contends that wherever it is feasible, it will save taxpayers money. The agency spells out the ideal conditions for a school district to take part in the Model School Program: when the authority and district agree that a new school is needed; when both parties agree on enrollment; when a suitable building site is available; and when the proposed new school and the prototype school have similar education plans.

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potentially costly environmental issues, or requires significant road and utility upgrades. Any one of those can throw a budget out of whack.

On top of that, the emotional attachment that local communities may form with the neighborhood schools can lead to design and construction decisions that are guided by factors other than finances and efficiency.

"Schools are very 'personal' elements of communities," the study says. "As a result, local viewpoints about them are driven by a host of concerns and beliefs …. The desires for local flexibility in siting and design often conflict with regulations and/or cost efficiencies."



Fayette Public Schools, Lexington, Ky., based its new construction estimates on schools such as Bryan Station High School, which opened in 2007 at higher construction prices. Photo courtesy of Fayette Public Schools

The Berkeley study, which focuses on California, but also looked at several other states, concluded that the three main elements affecting construction costs are state regulatory structures; local school politics, practices and design; and regional market conditions.

"School planning, design, and construction are highly local activities, and a large amount of variation exists in this work," the report says.

For instance, a growing school system that constructs facilities regularly is likely to have a larger staff and more expertise dealing with contractors than a small district that



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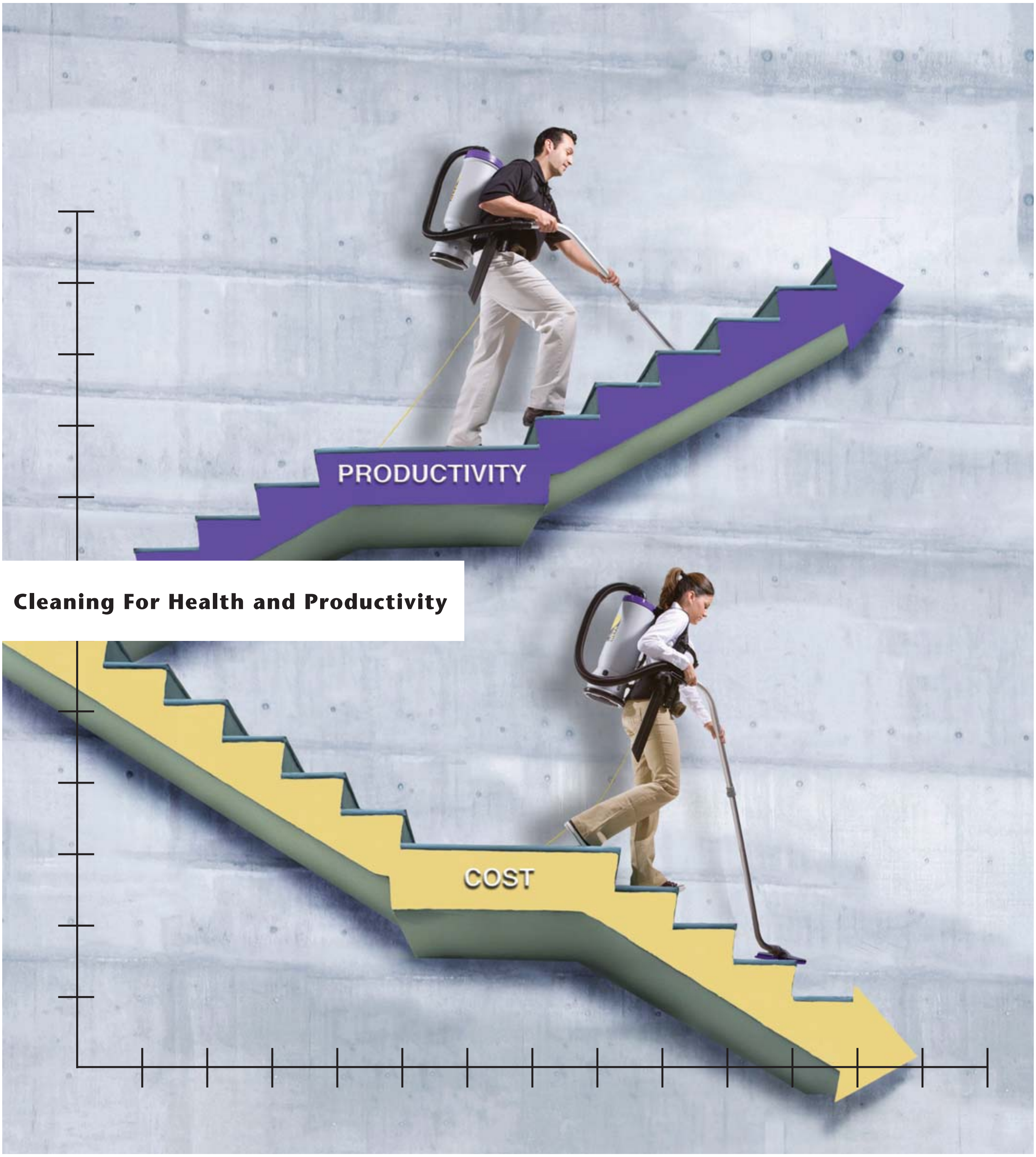
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might erect a new facility once in a generation.

"In many districts, personnel working on facilities planning have educational backgrounds and often do not have construction project management capacity," the report says.

The study's findings that market conditions can significantly affect construction budgets are supported by the spate of below-estimate bids in early 2009. Land prices, shortage of labor and materials, and fuel costs are reasons for climbing school construction costs, the study says. So when the market sees fuel costs that have dropped dramatically, materials costs that have declined, labor that is plentiful because of the lack of private construction, it stands to reason that schools and universities are benefiting.

Change orders

As construction bids in early 2009 come in lower than expected, one fear that some education administrators may have is that contractors may try to increase their compensation down the road by asserting they have unexpected additional expenses.

"I am a bit concerned that we may get hit with more change orders," says Wallace.



Yale University, Jeffrey H. Loria Center for the History of Art; Architect: Charles Gwathmey. Photo courtesy of Michael Marsland/ Yale University

Legitimate change orders occur frequently, Wallace says, when unforeseen obstacles are uncovered after construction has begun.

"If there are unknown conditions, like bad soil, or in a renovation, if you open a wall and find pipes that weren't on any of the existing drawings, you can't blame the contractor," says Wallace. "I don't know how you're ever going to escape change orders."

But that doesn't mean education institutions have to absorb cost overruns that are the responsibility of a contractor. Thorough planning and knowledge of project details will help safeguard schools and universities from unnecessary change orders.

"You have to be vigilant," says Wallace. "The best way you can protect yourself against that is to have really good drawings and specs." ■

Kennedy, staff writer, can be reached at mkennedy@ASUmag.com.

Economy prompts Ivy League slowdown

With the value of their endowments getting clobbered by the economic downturn, several Ivy League universities have decided to put the brakes on their ambitious expansion plans.

Yale President Richard Levin announced last month that construction projects already under way on the New Haven, Conn., campus will be completed, but "we will postpone construction on all other approved projects until conditions in credit markets improve or until gift funding is received. Unless gift funding is available, we will also delay design work on these projects. In total, we will be deferring capital expenditures of up to $2 billion over the next five years."

The postponed projects include two new residential colleges that would have enabled the university to expand undergraduate enrollment by 15 percent.

Meanwhile, at Harvard University in Cambridge, Mass., administrators have decided to slow down plans to expand across the Charles River into the Allston neighborhood of Boston.

"An unprecedented drop in our endowment and pressure on every other source of income have forced a careful review of all of our capital planning projects," Harvard President Drew Faust writes in an update about the project.

Harvard expects its endowment, which had been valued at nearly $37 billion, to lose about 30 percent of its value by the end of the 2008-09 year.

Faust says the university will continue—at a slower pace—the first phase of work at the site. That involves finishing the foundation of the 589,000-square-foot Allston Science Complex, the first buildings in the planned expansion. In the meantime, Harvard officials will assess "whether there are feasible ways to lessen the complex's cost, through design changes or other means," Faust writes.

In the long term, Harvard envisions a development in Allston that, over 50 years, adds as much as 10 million square feet of space and creates 11,000 to 12,000 jobs.

"Harvard's 50-year vision for Allston is undiminished, regardless of these short-term challenges. Allston is vital to Harvard's long-term future," Faust writes. "Over time, we envision a campus of buildings, pathways, and green spaces with a variety of academic and research uses, from graduate schools to science laboratories to space for arts and culture activities."

Brown University in Providence, R.I., also is curtailing capital improvements because of the recession. The Corporation of Brown University, which governs the school, has urged officials to pursue renovation rather than new construction.

WEB 101

Keeping costs down is a hot topic these days. Comment on this article at ASUmag.com.



Flexible furniture products, such as arced desks, can play a part in sustainability with their ability to adapt to different learning environments, making them usable now and in the future. Photo courtesy of Smith System and Achievable Dream School

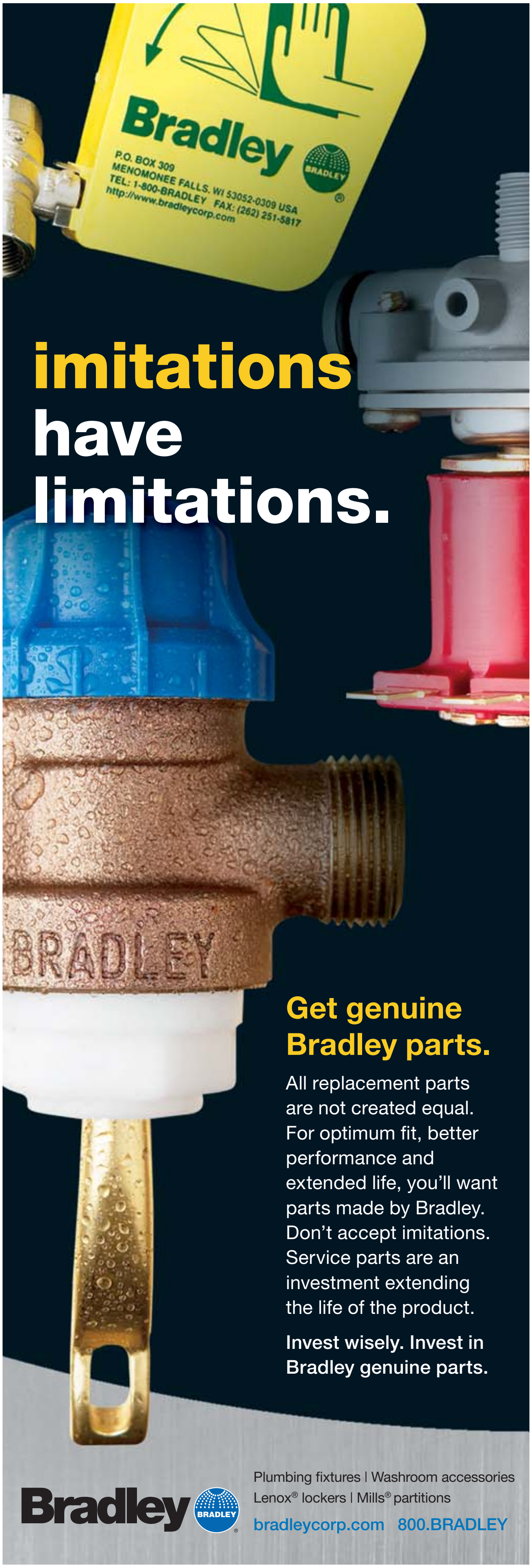
Healthful Choices

Selecting green education furniture can reduce VOC emissions and create a more healthful environment for students.

By Julie Hall

When selecting furniture for education institutions, administrators often consider durability and ergonomics as givens. The furniture they select must be comfortable for a variety of age groups and body types, and be able to withstand heavy use and last into the future. But many school officials are adding sustainability to their furniture selection criteria. And thanks to education furniture manufacturers rising to the occasion, specifying green furniture doesn't mean a sacrifice in comfort or quality.

"It's really a win-win situation," says Cathy Shields, LEED Coordinator for DES Architects + Engineers, Redwood City, Calif. "In my 15-year



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NOTABLE

80 Approximate percentage by which indoor air pollutant levels can be reduced when GREENGUARD-certified products are used.

Source: GREENGUARD Environmental Institute

career, I've seen some really great advances, and so many of the manufacturers that we use are on board, and they've been proactive. They have to stay competitive in the furniture market, so they've really gone all out to provide the right products, and the pricing is just as good."

What's the problem?

Although some school and university administrators have jumped right on board at the idea of specifying green furniture, others are reluctant. They think that it will cost too much or just isn't necessary. However, furniture and furnishings are a source of volatile organic compound (VOC) emissions in schools, and controlling the sources of the VOCs is one of the most effective ways of improving indoor air quality.

Fifty percent of all schools have indoor air quality concerns, which can lead to illness, increased asthma and allergy attacks, absences, productivity loss, poor student performance, adverse employee/student relationships with school administration and negative publicity, says Marilyn Black, founder of the GREENGUARD Environmental Institute (GEI).

A typical school can have anywhere from 200 to 1,000 different volatile organic compounds (VOCs) in the air at a given time. These VOCs originate primarily from furnishings, indoor activities and cleaning processes, and include known toxins and irritants such as formaldehyde, acetaldehyde, toluene and limonene.

A foolproof way education administrators can ensure they are selecting sustainable furniture products with low VOC emissions is by choosing products certified by independent sources, such as GEI. More than 90 percent of all manufacturers with GREENGUARD-certified products seek the Children & Schools standard, according to GEI.

This standard involves a rigorous evaluation and testing process. Manufacturers must have a high-quality system in place to ensure consistent manufacturing and proper supply chain control



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so all products continue to meet the standard. The products also undergo a quarterly quality check by measuring the emissions, says Black.

If a GREENGUARD-certified product isn't available for a furniture product, school and university administrators still can find sustainable options by thinking green before they make a purchase.

By asking the right questions, they can ensure the furniture products they select are sustainable, even if they don't carry a green certification, says Shields. Some questions to consider before purchasing education furniture:

•What materials are in the composition of the furniture? Does it have recycled content?

•If it's wood furniture, is it available with Forest Stewardship Council (FSC)-certified wood instead of veneer?

•Does it have a large amount of vinyl content?

•If it's upholstered, what is the content of the fabric? Is there a 100-percent-recycled polyester option?

•Where is the furniture fabricated? Is it shipped from overseas, and if so, is there a comparable product that is manufactured locally?

•What is the life cycle of the furniture? Are there opportunities to recycle, refurbish or resurface it?

•Is the furniture flexible? Is it usable now and in the future?

Reaping the benefits

The effort put into specifying green education furniture can result in better student health and green building certification for a facility.

"Data show indoor pollutant levels in the air within schools and indoor spaces where GREENGUARD-certified products are used can be approximately 80 percent lower," says Black.

Also, the reduction of formaldehyde, a carcinogen at elevated levels and long-term exposure, and an irritant at low levels, is a significant concern for school administrators, she says. An elementary school study in Atlanta showed that the use of low-emitting floor cleaners, low-emitting furniture and hard-surface flooring, all meeting the GREENGUARD Children & Schools standard, resulted in air levels of formaldehyde below the ½ California Chronic Reference Exposure Level (CREL) of 13.5 ppb, says Black.

An additional benefit to using sustainable education furniture is gaining green building credits toward certification. Credit for green furniture can be obtained under LEED for Schools (EQ Credit 4, Options 1-6), the Collaborative for High Performance Schools (CHPS) (EQ Credit 2.2 for low-emitting materials) and the Green Guide for Health Care (GGHC), which includes university hospitals (EQ Credit 4.5 for furniture), says Black. ■

Hall is associate editor for AS&U.



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The Madelia Elementary School, Madelia, Minn., project included an addition, renovations and demolition of a 1900s building. Commissioning consisted of design meetings, site observations during construction, and balancing and functional performance testing. Photo courtesy of Ralph Berlovitz

Ensuring Quality

Building commissioning for education institutions: Why is it needed?

By Paul W. Erickson

School facilities owners and operators should confirm whether their building systems are performing as expected. The more comprehensive the confirmation process, the greater opportunity there is for reducing operations and maintenance costs, and improving facility performance. A high-performing facility can boost student achievement and occupant comfort.

Sophisticated buildings

Education facilities are incorporating building systems with sophisticated technology, computer controls and circuitry for operation. These systems—heating, ventilation, air conditioning (HVAC); lighting-control; fire-alarm; energy-management; elevators; security; communications; and life-safety—need

to be evaluated to determine whether they are operating properly.

Building commissioning in the education industry began with indoor-air-quality concerns related to HVAC systems and fresh-air mandates for building occupants. Issues with mechanical controls, calibration, programming and energy management moved the commissioning process into full development.

The objective of building commissioning is to confirm that the facility fulfills the design intent for the building owner, occupants and operators.

Why commission?

The quality-assurance process of commissioning confirms, through testing, that building materials, equipment and systems are designed and installed properly, and capable of operating as efficiently as intended.

Commissioning improves systems reliability, energy performance, indoor environmental quality, and facility operations and maintenance. Additional benefits:

•More healthful and comfortable learning environments.

•Trained building operators.

•Lower energy costs.

•Maximized equipment life expectancy.

•Early detection of potential problems.

•Compliance with existing regulatory mandates.

The ASHRAE Standards Committee and Board of Directors have adopted Guideline 1.1-2007, which provides details for HVAC&R commissioning. ASHRAE defines commissioning as "a quality-oriented process for verifying and documenting that the performance of facilities, systems, and assemblies meet defined objectives and criteria."

Government and state education agencies regularly update commissioning standards for education construction projects. The emphasis that the LEED process places on building commissioning has heightened awareness of its importance. Professional services have expanded with more comprehensive procedures.

Establishing priorities

It is most cost-effective to design a commissioning plan with mechanical systems as a priority. At the project outset, criteria and expectations should be established for systems function, performance and operations. Schools should confirm criteria compliance during the design phase and construction process and during systems startup through the project warranty period.

Because facilities are more complex, and maintenance staff have less time to carry out more responsibilities, it is essential that a building's systems and controls are tested properly to determine if they are working as designed.

During the design phase, education institutions designate in-house personnel to work with the architect/engineer to define project expectations and specifications. Working with the owner, the design team develops and maintains "standards specifications guidelines" describing design intent and performance criteria for building equipment and systems. Serving as a basis for design continuity, this guideline is used by the design team and is kept current throughout the project.

At the 95 percent stage of construction documents, a peer review team performs a constructability review to flush out inconsistencies and define operations requirements for the design. The peer review team consists of the owner/operators, architect/engineer, construction adviser and commissioning authority. If an owner employs a separate commissioning agent, it is imperative the agent is a registered professional engineer (or architect, as appropriate) with state licensure and has adequate professional liability coverage if modifications are made to the design.

During the bidding phase, bidders should be informed about construction phase commissioning requirements. During construction, commissioning services consist of regular reviews of installations with prompt coordination for corrective work.

The most important part of the commissioning process takes place toward the end of construction, when testing and systems startup occurs. Installation and calibration verification, documentation of operations protocol, preparation of M&O manuals, training of building operations staff, and ongoing monitoring of equipment/systems are invaluable services that benefit the project. The construction contract should specify that trained personnel provide systems training to the owner's operators.

As a project is completed, commissioning should be integrated into the education institution's operations and maintenance plan, and the design team should update the "standards specifications" with new findings and building systems preferences for incorporation into the next project.

New/retro/re-commissioning

Building commissioning is performed on new construction, existing buildings never commissioned (retro-commissioning), and buildings previously commissioned (re-commissioning). Over the years, a building loses its peak performance.

Retro-commissioning brings building systems near to optimal original performance.

Monitoring-based commissioning, an expanded approach to retrofitting buildings, combines ongoing monitoring of systems in conjunction with retro-commissioning. Advantages include opportunities for benchmarking and systems performance data trending, providing building operators and designers with concise information for monitoring energy use and troubleshooting issues.

Wrapping it up

As commissioning services are reviewed, education institutions should involve the architect/engineer to evaluate proposals, as services may overlap with standard owner/architect agreements. The cost of professional services is dependent on the scope of services and the systems commissioned. Typically, fees for services are based on building square footage and vary depending on project scope and geographic location. Professional engineering associations can provide guidance about services and expected fees. Commissioning is well worth the investment, as education institutions will realize a quick cost payback and good value for the fees expended.

Building commissioning is the joint responsibility of the designer, contractors, education institution and the commissioning agent. Each entity has its own responsibilities, with the best interests of the education institution as the major objective. Communication and collaboration are critical to understand design intent, construction initiatives and expectations. Ultimately, the commissioning process integrates the responsibilities and activities of each party for a successful project. ■

Erickson, AIA/NCARB/REFP, is president of ATS&R Architects/Engineers/Planners, Minneapolis, a firm specializing in school facilities planning, design and construction services. He can be reached at perickson@atsr.com.

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To learn more about commissioning, check out February's cover story, "Green as the New Norm" on ASUmag.com.

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1998 Year that the Minnesota State Legislature enacted a commissioning statute requiring schools to confirm performance of HVAC systems before or shortly after occupancy.

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Training key personnel is an essential part of a comprehensive AED program.

Shocking Statistics

An AED program can give education institutions assurance that they have invested in technology that can save lives.

By Dave Bingham

On a Friday night in 2000, high school football player Josh Miller collapsed as he ran off the field. Several minutes later, the 15-year-old was dead from sudden cardiac arrest (SCA). This is not an uncommon scenario in school athletics. According to the American Heart Association (AHA), SCA is the leading cause of death in young athletes and Americans in general; it claims more than 250,000 lives annually. Statistics from the American Association of School Administrators indicate that 7,000 to 10,000 young people die each year from sudden cardiac arrest.

In June 2008, *U.S. News and World Report* published the results of a study from *HeartRhythm Journal* that found that students who suffer from SCA have only a one in

10 chance of survival. Of the cases that occurred from 2000 to 2006, the overall survival rate was 11 percent, ranging from 4 percent to 21 percent per year. A majority of these incidents occurred somewhere on school property.

As schools consider the issue of SCA, they should recognize that it is an important issue not only for student athletes, but also for community members. About 20 percent of a community's population is at a local school on any given day, whether it be to drop off something for a child, attend a social function or volunteer.

When someone experiences SCA, the time for response is short. The AHA advises the optimum time for reviving individuals suffering from SCA is within three minutes of the incident. When a person has immediate access to automatic external defibrillators (AEDs), these survival rates increase by as much as 80 percent. This rate drops to 2 percent for individuals left untreated after 10 minutes.

The argument for AEDs

Local emergency-response teams are equipped with AEDs and generally are very efficient, but a number of factors can prevent a timely response. For instance, an emergency squad might be at another call, encounter traffic on the way to the school or have to climb several flights of stairs in order to find the individual. This valuable time can mean the difference between life and death.

To help increase the chance of survival for individuals who experience SCA, more schools have installed AEDs. Several states are debating whether to mandate AEDs in schools; still, many institutions do not have the devices. Facility managers can better protect the health and safety of building occupants by acquiring AEDs. In addition, they can play an important role in helping determine which AED might be best for their facility.

Some school decisionmakers have come to believe if an AED is deployed improperly, the school will be held liable in a legal suit. As a result, many schools are reluctant to acquire an AED. But recent court decisions and Good Samaritan laws have established that in most situations, an individual who attempts to resuscitate an individual with SCA, or the facility in which the incident occurred, will not be liable. Good Samaritan laws are intended to re-





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duce bystanders' hesitation to assist for fear of being sued or prosecuted for unintentional injury or wrongful death. Based on recent court decisions, facilities without an AED may have greater liability exposure than those that have an AED onsite.

Establishing an AED program

Buying AEDs is the first step to developing an AED program. AEDs should be accompanied by a comprehensive training and maintenance program to ensure the unit is always ready for use. Some considerations:

•**The unit:** Most AED systems offer voice-activated prompts that guide a user. Once a unit is turned on, the user is instructed to place the two pads on the patient's chest. The pads analyze the patient's cardiac activity and determine whether or not defibrillation or shock treatment is needed. If a shock is needed, the light on the AED flashes, and the user is instructed to press the shock button. The pads deliver an electrical current, which is delivered once the button is pressed; the user then is instructed to begin CPR. The AED counts out the exact amount of time for CPR to be conducted and then reassesses the individual. In a majority of cases where the patient has been saved, it usually is the first shock that re-establishes the individual's normal heart rhythm.

•**Training:** Key school personnel such as security staff, administrators, coaches and trainers generally are the first to be alerted when an SCA incident occurs, so they should be trained to use AEDs properly. This training should be part of a comprehensive AED program that specifies how personnel should respond and how the AEDs should be maintained.

Once key personnel are trained, all school employees should be made aware of the new program and the steps that should be taken if an SCA event occurs. This communication also should include the chain of survival: early access (calling for help and providing emergency medical services), early CPR, early defibrillation and early advanced care.

•**Maintenance:** To ensure units are kept in working order, many schools use AED suppliers that offer online maintenance programs. After a school buys AEDs, representatives from the company work directly with the school and develop online programs that simplify the process of maintaining the unit, updating training records and tracking when its components should be replaced.

Location, location, location

Once a school has AEDs, it needs to decide where the units should be situated. The AHA specifies that AEDs should be placed in areas where they can be deployed within three minutes. In order to decide an optimal location, facility managers and administrators should identify key locations within the building where an SCA incident is most likely to occur. For instance, large rooms used to host events such as auditoriums, gymnasiums and cafeterias are good locations for AEDs. In addition, main corridors linking these areas also might be a target location.

In a school, units should be kept in an unlocked, alarmed cabinet that sounds when it is accessed. Locked areas such as a nurse's office are not ideal locations. If AEDs are not accessible within the first three minutes that an incident occurs, the individual's chance of survival is reduced greatly.

AEDs also should be accessible during outdoor athletic events such as football and soccer games, cross-country and track meets, and practices. This can be part of an emergency-response bag that includes emergency oxygen, an AED, a first-aid kit and trauma equipment. Coaches and athletic trainers should be ready to deploy an AED if necessary.

NOTABLE

3 Recommended maximum number of minutes that should elapse before an AED is deployed.

Source: American Heart Association

Protecting the masses

Facility managers at schools should make staff aware of how to identify an individual with SCA, where units are situated and who to contact if an AED needs to be deployed. At schools without AEDs, facility managers should encourage administrators and other key personnel to review the statistics associated with student SCA and the importance of AEDs in reducing deaths associated with SCA.

Schools are epicenters of the community. AEDs are situated throughout many other community facilities such as grocery stores and exercise centers, but many schools are not equipped. With the new information relating to the risks associated with SCA in schools, now is the time to take action. Grant programs are making it possible for schools to secure funding for AEDs.

An AED program lets parents, administrators, students and community members know that schools have the technology that can save lives. ■

Bingham is Director of AEDs and Training for Cintas' First Aid & Safety division, Cincinnati. He can be reached at binghamd@cintas.com or (800)246-8271.

WEB 101

Do you have AEDs at your institution or wish you did? If so, comment on this article at ASumag.com or at Schoolhouse Beat: The Blog.

Breaking Tradition

Will fiber ever make it to the desktop?

C. WILLIAM DAY



Day is senior analyst at KBD Planning Group, Young Harris, Ga., a firm specialized in education facilities and technology planning. He can be reached at bday@kbdplanning.com. www.kbdplanning.com

In early 1995, when schools and universities began rewiring buildings from thin net and Category 3 infrastructures, some predicted that copper network infrastructure cabling had seen its end, because of emerging technologies and the demand for bandwidth speed. Nearly 15 years later, it is hard to believe that copper wire still is king. In most cases, the reason is more than the cost of fiber-optic cable. Evidence from contractors, system designers and installers, along with results obtained by interactive cost models, shows that fiber to the desktop (FTTD) is already cost-effective in many scenarios. Not only is the installed first cost of a fiber-based system often within 20 percent of a copper-based system, but in some cases, fiber also is at cost parity or even less expensive.

So, why does unshielded twisted-pair (UTP) copper cable still dominate to the desktop? Perhaps the largest barrier is perception. Multimode fiber (MMF) is being used extensively in building backbones; however, when users consider cabling options for horizontal pathways, they often choose traditional copper paths rather than considering new information about fiber. So, why hasn't fiber-optic cable made its way to the desktop? The answer is three-pronged.

First, copper cable manufacturers spend millions on making sure copper wire still is specified for LAN infrastructure. Buzzwords such as 100 MBPS, Gigabit and 10 Gigabit are all terms derived from the reinvention of products to create a demand for rewiring.

Also, the manufacturers of data switches have not caught on to the potential of the fiber-to-the-desktop concept. The technology is all in place and has been for years, but there is not an economical 24- or 48-port fiber switch on the market yet.

Finally, people continue to do what they know. There will have to be a paradigm shift in the industry to push fiber to the desktop. Predictions have been made that by 2012, because of the cost of now what is called "Enhanced Category 6E" wire, fiber cabling shipments will surpass UTP.

Also to be considered in fiber's favor are the increasing cost and complexity of installing new grades of UTP copper. Cat 6 and 6E cable and components are more expensive. Getting full throughput on a system requires precise installation techniques and specific testing that installers must learn.

In contrast, fiber-optic cable offers greater pulling strength and is immune to electromagnetic interference (EMI), radio-frequency interference (RFI) and crosstalk. Fiber also is smaller in diameter, lighter in weight and easier to test. Once users are more comfortable installing FTTD, they will enjoy the long-term benefits of fiber cable: higher bandwidth and lower maintenance over a network life of 10 to 15 years. ■

New Beginnings

Learning to embrace change.

"New beginnings" mean change. Change creates new challenges and opportunities. A new school replaces an old dilapidated school building, or an old landmark school building is renovated. School boards, administrators, faculty, support staff, communities and, most important, students get a real uplift.

For many, new beginnings can be a difficult period of adjustment. The planning, design and construction process evolves over several years before a school building is ready for occupancy. New educational philosophies frequently require innovative design concepts that force people from their comfortable setting. Participatory planning sessions offer opportunities for staff to embrace new educational philosophies and innovative designs, but many still are reluctant.

A classic example occurred when one administration decided to create an "open classroom" without consulting teachers. The design was the dream of a planning committee, but once the building was ready for occupancy, none of them was involved in the school. Many staff members would not accept the change, and the open-styled classrooms remained self-contained because the folding partitions were not opened. Several years after opening the school, a new principal who had been part of the planning committee was hired, and teachers finally began using the building as designed.

Spencer Johnson's book *Who Moved My Cheese?* uses the cheese as a metaphor for what a person wants in life, such as a possession, relationship or career. Johnson illustrates several important ideas that can be applied to the world of education:

•**Change happens**. Recognize that change is always occurring, whether in the classroom, school, educational philosophies, curriculum or the occupants.

•**Anticipate change**. Stay positive and realize that change is happening not only to you, but also others, including the students in the classroom.

•**Monitor change**. Be aware that change is happening.

•**Adapt to change quickly**. The quicker you let go of the old, the sooner you can enjoy the new.

•**Change**. Accept the change as a new beginning.

•**Enjoy the change**. Too many people are too comfortable in their own setting and are not willing to enjoy change.

•**Be ready to quickly change again and again**. Remember, change is a constant. The change might be in the classroom; in the functional use of spaces; in the furniture, fixtures and equipment; or in the operations and maintenance of the facilities.

Are you ready for a "new beginning?" Change can be difficult and challenging, but we all need to open the door and welcome new beginnings with a positive approach. ■

JAMES E. RYDEEN



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STEPHEN ASHKIN



Ashkin is executive director of the Green Cleaning Network, a 501(c)3 not-for-profit educational organization.
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The news has been filled with stories about the economy and how to stimulate it, as well as discussions about building and renovating schools. So it's a good time for schools to incorporate greener concepts.

Schools and universities have acquired significant knowledge from the U.S. Green Building Council and its LEED rating systems. Other valuable sources: the Collaborative for High Performance Schools and tools from the U.S. Environmental Protection Agency, such as the IAQ Building Education and Assessment Model (I-BEAM).

Plenty of information exists to help create space that is more conducive to learning with gentler impacts on the environment and lower operating costs. But this column is about recognizing the role of those with expertise in cleaning. It is important that education institutions make specific efforts regarding operations, cleaning and maintenance.

Some areas where people with cleaning experience can help:

•**Selecting carpets and other flooring materials**. An informed decision requires an understanding of what it will take to keep light-colored carpets and floors clean, especially if there is no budget allocated.

•**Restroom designs**. Designers need to understand the problems associated with grout (especially light-colored) between floor tiles. This includes the size of the tile, the color of the grout and perhaps even the choice of a different flooring material. Plus, input on paper dispensers, size of trash receptacles and other issues can result in sizable savings (both dollars and environmental) over the life of a building.

•**Size and location of custodial storage areas and janitor closets**. There is no "standard" size or location; these need to be decided based on what is going to be cleaned and what equipment will be used. This information can come only from those who know something about cleaning.

•**Entryways designed with matting systems to capture soil before it gets into the building**. It is important to remember that these areas require electrical outlets so the mats can be vacuumed. Mats also can be used outside entrances. Water spigots should be available near front entrances to clean sidewalks and exterior entryways.

•**Exterior landscaping to prevent soils, such as flowers and berries from plants**. Cleaning experts can provide advice to landscapers, as the selection of plants can directly affect the soils that get tracked indoors.

•**Loading docks**. Maintenance personnel can help designers understand what is needed in loading dock and waste-storage areas. They have to discourage pests, be large enough for compactors, and be easy to clean.

Cleaning expertise is crucial for the greening of new or renovated education facilities. Now more than ever, it can make a difference that will affect those buildings for years to come. ■



GREEN schools & universities

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INSIDE THIS SPECIAL SECTION:

Pioneer Middle School
DuPont, Wash.

Architect: DLR Group
Photographer: Chris J. Roberts Photography

The "Green Touchscreen" provides easy access to current events, energy metering data (water, gas, electricity) and weather data. Teachers and students can use this technology to explore responsible energy usage within the building. For more information and photos of the school, visit ASUmag.com/green.

Finding Funding

Deciding to build more sustainably can uncover additional sources of financing that wouldn't be available for a more conventional school.

By Paul Bunton



By renting its roof to a solar power company, Christopher High School, Gilroy, Calif., is designed to receive an array of photovoltaic panels that will produce 30 percent of the school's energy requirement. In addition, the solar panels will be integrated into the curriculum. Rendering courtesy of BCA Architects

Integrating sustainable design into schools no longer is seen as just an interesting alternative; it's becoming the mainstream approach in facility design. "For students and families across the country, more green schools ultimately mean more effective education facilities, significant operating costs savings, a better environment and healthier communities," explains Rick Fedrizzi, president of the U.S. Green Building Council (USGBC), which oversees LEED certification.

"We've figured that, on average, green schools save $100,000 per year in direct operating expenses," says Rachel Gutter, senior manager for the educational sector, USGBC. Using an average of 33 percent less energy than conventionally designed schools, according to Greening America's Schools, a 2006 report, "green school facilities also increase air quality, cut water use, and reduce other resource uses significantly."

These kinds of benefits explain why more than 1,000 schools across the nation are either LEED-certified or seeking certification. Thousands more have embraced some aspect of sustainability in design and day-to-day operations. Yet, one of the greatest deterrents to creating more green schools is the perception that it costs more.

But by building more sustainably, schools can find additional sources of financing that wouldn't be available for a more conventional construction project. There isn't one easy source for funding information, but there are many resources available.

"Don't write high performance off because of cost," says Ariel Dekovic from The Collaborative for High Performance Schools (CHPS). "There are certainly many strategies and if you think about it from the beginning, it can reduce the costs."

National sources

The Department of Energy (DOE) and the Environmental Protection Agency (EPA) provide resources and technical information. The DOE recently has released the "Guide to Financing Energy Smart Schools," which addresses financial barriers to constructing and retrofitting high-performance schools.

The EPA provides technical information through its Energy Star building labeling program and also addresses indoor air quality (IAQ) through its Tools for Schools Program, which focuses on sound management practices.

A nationwide Green Schools initiative, USGBC's "Fifty for Fifty," urges state legislators in every state to create green schools caucuses. Launched in September 2008, the initiative includes opportunities for partner-


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ships with community experts such as architects and contractors, as well as local incentives offered to promote green building. Cost-benefit studies, best-practices and information on developments and trends also will be available soon.

A possible future program is the 21st Century Green High-Performing Public Schools Facilities Act. The House passed it in 2008, but the Senate did not act on the legislation. It would provide more federal funding to create sustainable schools.

The American Recovery and Reinvestment Act sets aside about $8.8 billion in state fiscal funds for addressing safety and other government services, and this may include school renovation and modernization through a recognized green building program. Each state has a process for allocating these funds through the governor's office. School districts, communities and legislators need to promote funding for green building.

A few provisions in the Energy Act have been authorized, but not yet funded; for example, research to demonstrate the benefits of good indoor air quality. More federal funding and programs will become available under the new administration.

Students fund solar panels

Thomas Jefferson (TJ) High School for Science and Technology, a public school in Virginia, has not let funding detour its efforts to go green. A group of students formed the TJ Environmental Impact Club in 2006 with the goal of bringing clean energy to the school. It decided to go solar.

Its state is not generous when it comes to funding solar. "We had to look elsewhere," says Amanda Hurowitz, one of two teachers working with the club. "We targeted four groups: parents, alumni, other TJ clubs and corporations." The group started with the Parent Teacher and Student Association, put up tables at school events and spread its need for funds by word of mouth. "Then we convinced our alumni association to send out an e-mail and give us access to their database to send out printed information," says Hurowitz. "We solicited donations from other clubs and Future Business Leaders of America, and raised $8,000. We also convinced the class of 2007 to give us $6,000 as their school gift."

Next, the group cold-called corporations. "We received donations from Dominion Power, Texas Instruments, Patagonia and Java Green," says Hurowitz. The student volunteers teamed up with Alexandria Whole Foods to raise funds on Earth Day 2008, receiving 5 percent of all the store's receipts for that day.

So far the club has raised $44,000. The school has solicited bids and is buying a 4 kilowatt system with an oversized inverter "so we can easily add to it." A kickoff ribbon-cutting ceremony—and press event to raise more funds—is in the works.

Check it out at http://tjspi.110mb.com/.

State programs

Grants for green schools and similar programs also are available; the amounts vary considerably. Funding is available for promoting energy and water efficiency, maximizing natural lighting, improving indoor air quality, using recycled and less toxic materials, and other green improvements that help teaching and learning.

California, Ohio, Pennsylvania, New York, Washington and several other states have funding to finance the design and construction of green schools that comply with the criteria established by CHPS, LEED or specific state criteria. In California, the High Performance Incentive Grant program earmarked $100 million for "green" school projects, funded by Proposition 1D.

Other California programs include the Bright School Program, Energy Efficiency Financing Program and Savings by Design.

Ohio also has a number of programs to support local communities in designing and building sustainable schools. The state is investing more than $4 billion toward green school construction, aiming to start 250 green school projects within the next two years. Ohio anticipates these green schools will save more than $1.4 billion in energy and water reductions alone over a 40-year period.

Foundation grants

Foundations provide a variety of funding for going green, often with limitations on who can apply and how the funds are used. The Kresge Foundation, a proponent of green design, has a nationwide $8 million green-building initiative. The independent Chartwell School in Seaside, Calif., which educates children with dyslexia, received a planning grant of $75,000 from the foundation and,

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- ASUmag.com: your source for green planning and design articles.
- www.chps.net/manual/index.htm: The Collaborative for High Performance Schools, Best Practices Manual (Volume II, Design, is full of useful information)
- http://apps1.eere.energy.gov/buildings/publications/pdfs/energysmartschools/ess_financeguide_0708.pdf: Guide to Financing EnergySmart Schools, Department of Energy
- www.energystar.gov/index.cfm?c=business.EPA_BUM_CH10_Schools: Energy Star, EPA and Department of Energy
- www.epa.gov/iaq/schools/index.html: EPA's IAQ Tools for Schools Program
- www.BuildGreenSchools.org: USGBC

Free Resources

Green terms

•**CHPS (Collaborative for High Performance Schools)** is a national non-profit organization that offers resources, assessment tools and recognition programs for building and operating high-performance, healthful, green schools. It offers state-specific rating systems designed by school facilities experts to create schools that are both good on the environment and healthful for users. Schools can receive third-party verification, and they also can self-verify. (www.chps.net/)

•**Commissioning** is a process to determine if building goals get met. Performance goals are set and communicated to the members of the design and construction team. The building is tested after construction to see if it indeed met performance goals, and adjustments are made if not.

•**Green buildings** are sited, designed, constructed and run in a manner that promotes resource conservation and care for the environment.

•**High-performance schools** enhance learning, reduce energy consumption and improve health and comfort through qualities such as good indoor air, lighting and noise reduction. (www.epa.gov/iaq/schooldesign/high-performance.html)

•**LEED (Leadership in Energy and Environmental Design)** is a green building certification system created by the USGBC. LEED certification is recognized nationally and uses points to achieve certification levels from the minimum, a LEED-certified building, followed by silver, gold and, for the highest points, a LEED platinum rating. There is a LEED rating system specific to schools.

•A **LEED AP (LEED Accredited Professional)** has demonstrated a thorough understanding of green building practices and principles. An AP is credentialed to oversee the LEED certification process.

•**Life-cycle costing** takes into consideration the long-term costs and benefits of operations and maintenance when comparing different designs to reveal the "best over time" investment choice.

•**USGBC (The U.S. Green Building Council)** is a non-profit organization committed to expanding sustainable building practices. Its mission is to transform the way buildings and communities are designed, built and operated. (www.BuildGreenSchools.com)

•A **Whole system or whole building approach** focuses on how the parts work together, not on separate components of a building. Green systems are considered at the start of the development process, rather than a later addition, and care is taken in how they work together to increase their impact.

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a year later, a challenge grant of $750,000 to turn its plans into reality.

Daylight modeling was used to situate the new school building and maximize light. By controlling heat gain, the need for electricity is reduced by half. Classroom ventilation takes advantage of existing convection currents to use microfans and air-quality sensors instead of the air being handled through ventilation ducts, which require more maintenance and create more noise. The roofing system catches rainwater, feeds it to a cistern, and the water is used to irrigate the landscape, reducing building water usage by 70 percent. Chartwell is the first complete school campus to be awarded LEED platinum.

Many foundations operate within a specified geographic area. Information on foundations can be found through sources such as The Foundation Center (http://foundation-center.org/).

Partnering up

Businesses, particularly those with a national presence, often are interested in supporting green initiatives for schools. Funding can range from small grants to the entire financing of a new school. In Pennsylvania, Microsoft teamed up with the School District of Philadelphia to build the sustainable School of the Future as a model of a successful educational environment. Eco-Media teamed up with CBS to create a Green Schools Initiative, giving $250,000 "green makeovers" for selected schools.

Many new solar-power companies are emerging and eager to work with non-profit organizations such as school districts. Through power purchase agreements (PPA), these companies take advantage of state and federal grants for alternative energy, essentially renting the roofs from schools to place arrays of photovoltaic panels. These companies receive up to a 40 percent tax credit for fronting the costs of the solar panels. In turn, they sell the power back to the school districts at a discount, to 20 percent below market rate. ■

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Green Opportunities

Existing buildings are a key component in making a campus sustainable.

By Susan Haifleigh



Salem State College, Salem, Mass., is tracking sustainability on campus.

The significance of green building initiatives on college campuses is becoming increasingly evident. Sustainable facilities are a reality and even a necessity for forward-thinking schools. Many campuses have established an office of sustainability; more than 600 presidents of U.S. higher-education institutions have signed the American College & University Presidents' Climate Commitment (ACUPCC), which pledges that they will create a plan to achieve climate neutrality as soon as possible.

Prospective students also are considering sustainability efforts as they decide which college or university to attend. And more donors and alumni are asking that their donations be earmarked to make campuses greener or to develop courses around environmental sustainability.

Much of the buzz around green buildings has centered on new construction. But the inventory of existing buildings far exceeds that of new construction. According to the U.S. Green Building Council, existing buildings in the United States account for 36 percent of total energy use and 65 percent of electricity consumption. They make up 30 percent of greenhouse gas emissions and 30 percent of waste output, totaling 136 million tons annually.

Making existing buildings more sustainable is critical to achieving large-scale environmental benefits. Sustainability initiatives in existing buildings also promote significant business benefits, ranging from enhanced productivity to operational savings. But how can an institution effectively evaluate its sustainability options and focus its "green" dollars where they will have the greatest effect?

Green assessment

The first step in identifying the best strategy for pursuing sustainability is an objective evaluation of a college or university's existing level of sustainability and its options for change, including estimated costs and potential benefits.

Examining all these areas holistically—ideally within the context of overall facility improvement needs—can help schools identify economies of scale and bundle the resulting projects most cost-effectively. These categories include energy efficiency, water conservation, indoor air and environmental quality, materials and construction, and site sustainability:

•For schools looking to roll out green programs incrementally, the initial focus often is on **energy**

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efficiency. This is because more effective energy use can deliver the greatest cost savings. An evaluation of energy performance, including electrical and mechanical systems and the potential for renewable energy sources, should identify recommendations for reducing operating and consumption costs and decreasing emissions. In some cases, the savings captured through improvements can be used to pay for other longer-term sustainability initiatives.

•**Water consumption and treatment** and the impact on discharge systems, as well as campus water-use practices, also should be assessed to identify opportunities to increase efficiency, reduce waste and improve water conservation. Installing water-flow controls on faucet and flush systems or capturing rainwater for campus landscaping for irrigation are some examples of water-saving initiatives.

•**Indoor air quality, lighting quality and thermal comfort** also are important elements of sustainability. An acceptable amount of fresh air provided through a building's HVAC system is important to the health of all building occupants. Eliminating ozone-depleting gases from HVAC, refrigeration and fire-suppression systems is critical to the integrity of the atmosphere. Bringing natural light into the interior of a building can decrease energy use and enhance productivity.

•**Materials and construction** is another area where green initiatives can save schools money. Campuses can reduce waste associated with building operations and maintenance; establish recycling and conservation programs; and carry out enhanced waste-management practices. The availability of construction materials that have recycled content or are harvested from sustainable sources is growing significantly. Products such as flooring, wood products, structural-steel components or roofing materials can be obtained at prices comparable to their traditional counterparts.

•Schools can identify **exterior opportunities** for promoting more sustainable campuses by assessing ways to employ exterior lighting more effectively; altering landscaping to promote native species and reduce erosion; and making better use of stormwater runoff. It also is important to reduce or protect large surface masses such as parking lots and roofing systems that absorb and concentrate large amounts of heat and affect a site's micro-climate.

Capital planning

With detailed information about the costs and benefits of potential green investments, colleges and universities can evaluate which initiatives will provide the greatest benefits over the short and long term. Each school will have different financial goals. The potential greening initiatives compete with many other capital and operational investments—for systems renewal, building renovations and new construction. Schools may single out sustainability improvements for analysis, but those investments must be assessed in the context of overall campus needs.

As schools make progress—and see results—they may decide to pursue additional greening opportunities. Further assessments may be conducted, for example, in support of major building renovations or large-scale master-planning programs. By combining this information with detailed data about overall requirements across a building portfolio, colleges and universities can develop a holistic view of facility needs. ■

A leading example

The "2007 Kiwi Green College Report" named the top 50 schools that "will help your kids help the planet," and Salem State College, Salem, Mass., was one of those 50. The college has shown leadership by undertaking a ground-breaking approach to tracking sustainability on campus.

Stephen Keyes, director of campus development, and Thomas Osborne, director of sustainability, saw value in combining the college's traditional facility condition assessments with green initiatives that would help the campus meet the American College & University Presidents' Climate Commitment.

The college wasn't setting aside funding for specific green initiatives, but administrators felt it was important to single out projects and costs that could enhance campus sustainability.

"We have positioned ourselves to be first in line when the funding becomes available, and the best way to accomplish that was to know where we stand currently, what we want to undertake and how much it will cost," says Keyes.

Working with its existing facilities group and a consulting team, Salem State established a specially trained green assessment team to identify potential green opportunities, and conventional operations and maintenance needs simultaneously. This approach minimized deployment costs, and the resulting data helped the school set its conventional capital funding and planning goals, as well as its sustainability goals. By working on one portion of its existing building portfolio at a time, it has been able to minimize the upfront investment and maximize the effectiveness of the dollars spent with a better decisionmaking process.

As Salem State conducts building assessments in the future, it will be able to build upon the foundation provided by the green assessment.

Haifleigh is director of sustainability solutions at Boston-based VFA, Inc., a provider of solutions for facilities capital planning and asset management. She can be reached at shaifleigh@vfa.com.

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University of Southern California, The Lot, Los Angeles

Semi-permanent building solution

Temporary commercial kitchen facility erected on campus parking lot solves university's dining dilemma

Sprung Instant Structures. A two-year renovation project at the University of Southern California (USC), Los Angeles, which included the campus dining facilities, created the need for a full-service dining facility on campus in a short timeframe. The university had to find a semi-permanent building solution that also could meet the city's building code requirements.

Sprung Instant Structures, along with general contractor W.E. O'Neil and KTG "Kitchens to Go," teamed up to produce an 11,238-square-foot temporary commercial kitchen facility. The team had about 3½ months to turn the site from a parking lot into a dining facility, and it completed the project on time and under budget.

The Lot is the largest single dining complex at USC, consisting of seven dining options and a retail store. The dining area has 373 interior seats and 137 exterior seats, with five plasma screens, a contemporary sound system, coffee, desserts, ATMs and wireless Internet.

Sustainable materials were used to build the dining facility. Many of the materials will be used again on a different project. The Lot also uses less electricity and air conditioning, and uses natural light during the day. It is hiring a waste-management company to ensure that recycled materials are separated and disposed of properly.

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Green cleaning

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Space-Ray. The PTS/PTU Series Low Intensity Infrared Tube Heaters come with a patent-pending Innovative Tube Integrity Safety System (TISS) that provides additional safety for building owners. Available in both natural and propane gas, the heaters use positive pressure to push products of combustion through the heavy-duty calorized, aluminized or alumatherm steel combustion chamber. This new series ensures the integrity of the system and provides the ultimate in fire protection for positive-pressure radiant tube heaters.

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Wireless test receiver

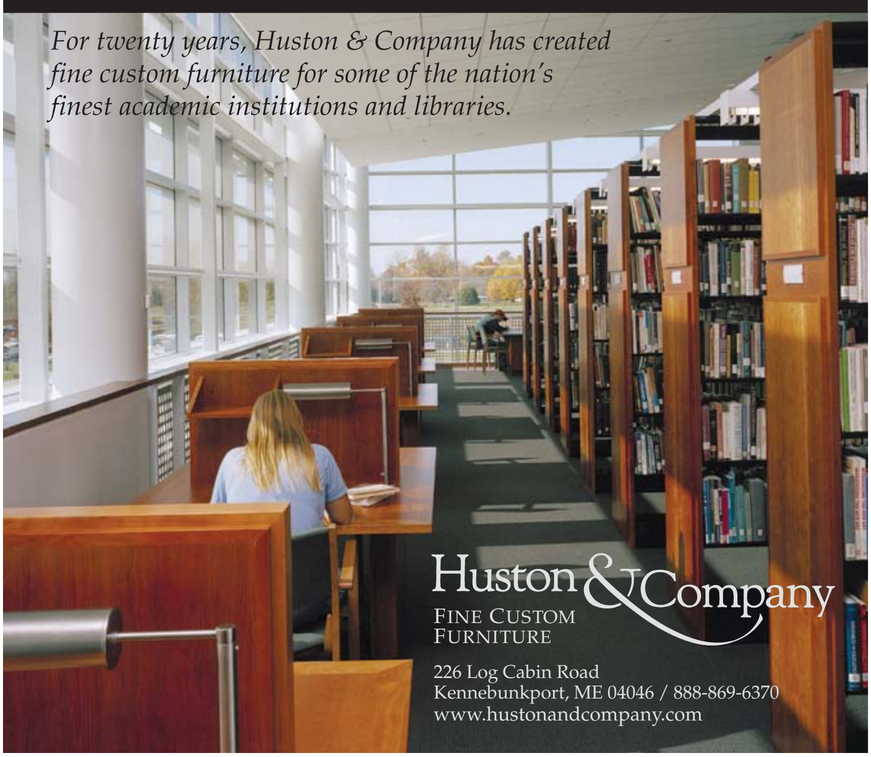


Berkeley Varitronics Systems, Inc. The BEETLE-B/A/N/G is a wireless test receiver system that verifies, sweeps, measures and optimizes all popular 802.11 Wi-Fi network standards. Powerful packet analysis features, such as Delay Spread, Channel Frequency Response (CFR), Multipath (Ec/Io), Signal-to-Noise Ratio (SNR), SSID and Received Signal Strength Indicator (RSSI) give it the distinction of being the only true handheld Wi-Fi packet analysis and direction-finding tool accurate to within +1 dB. ■

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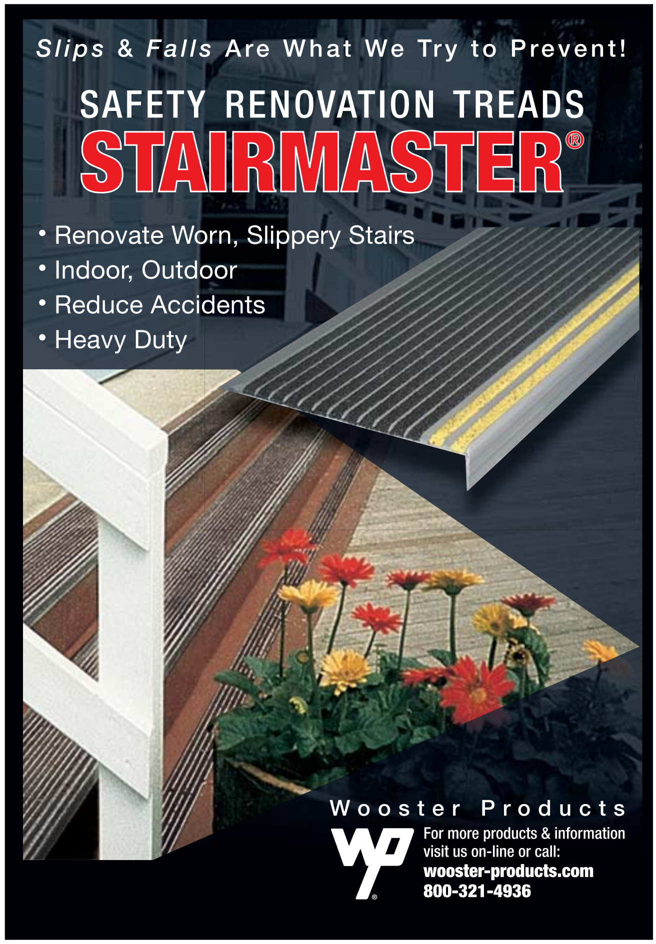
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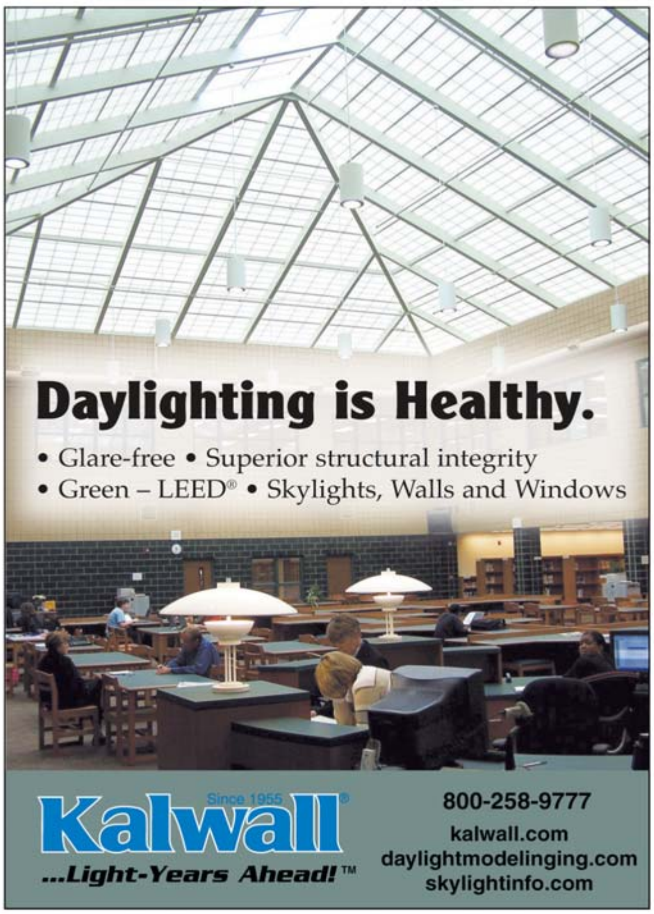
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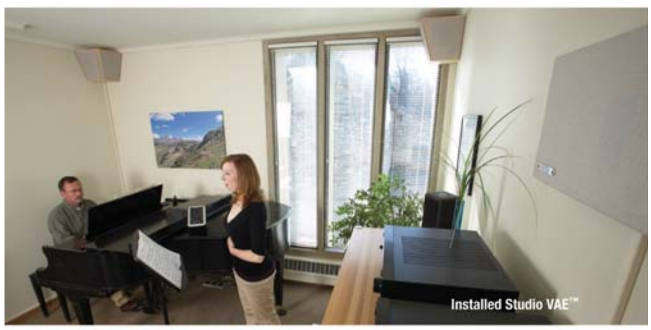


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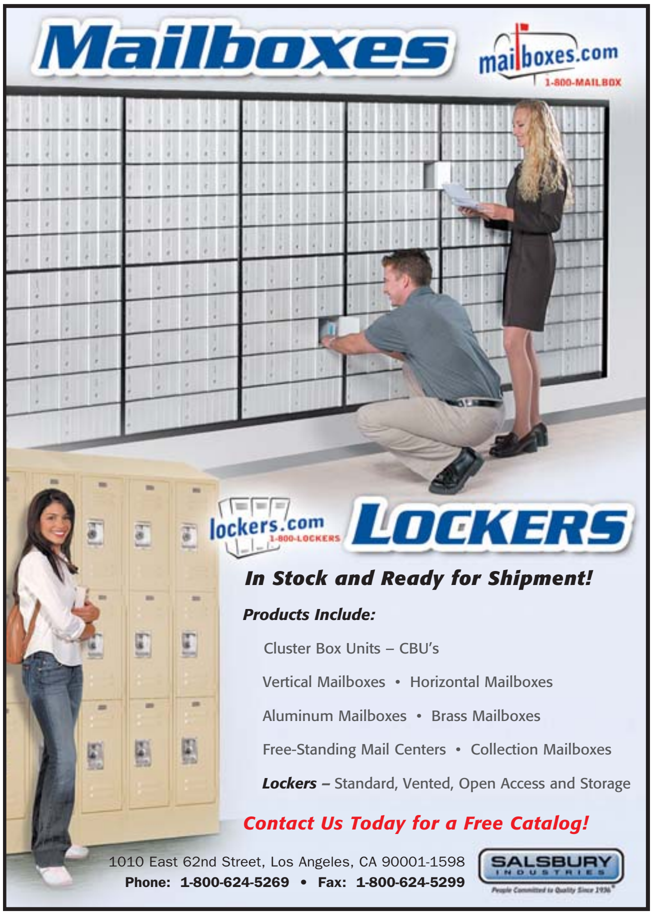
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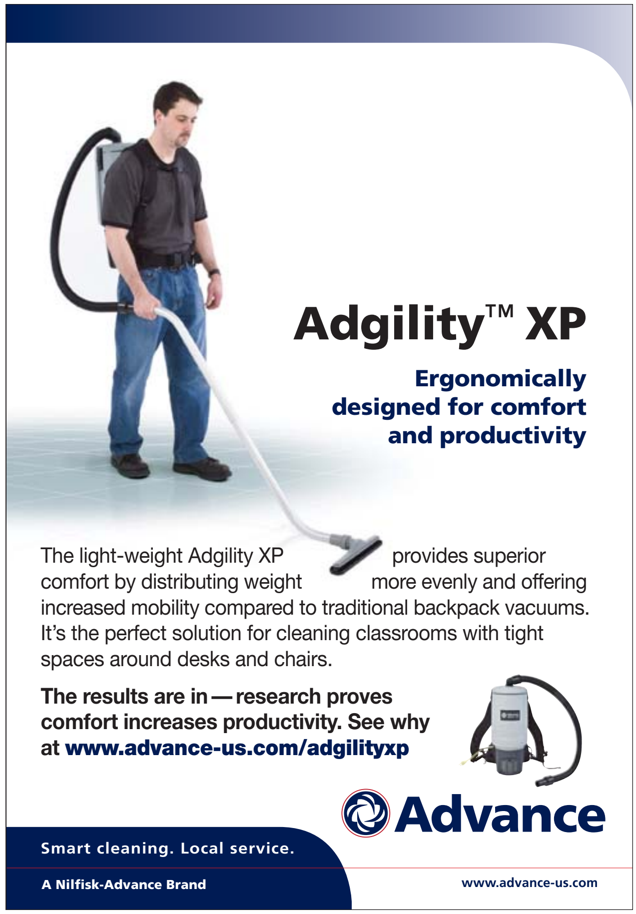
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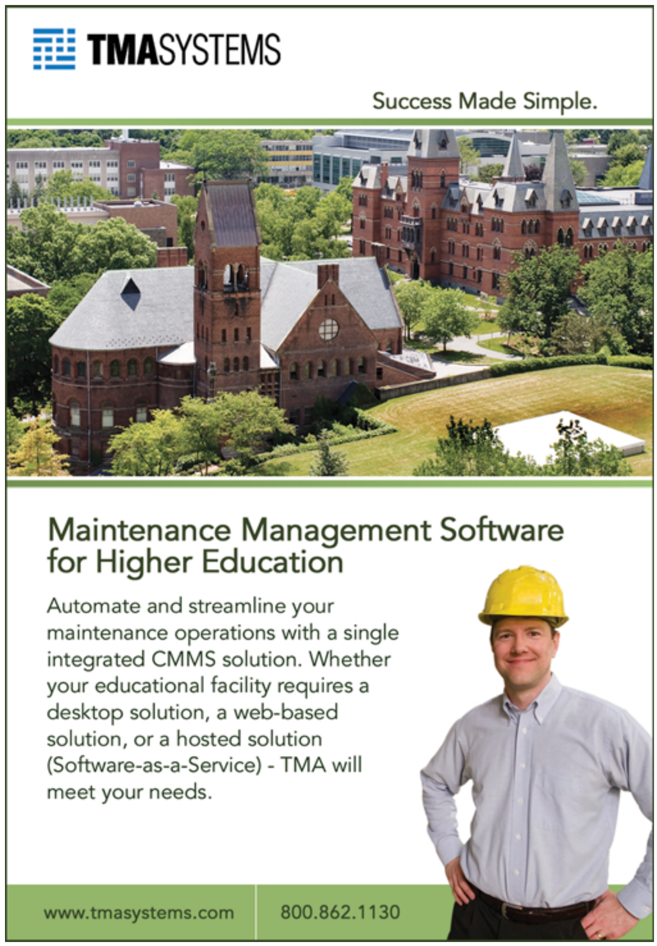
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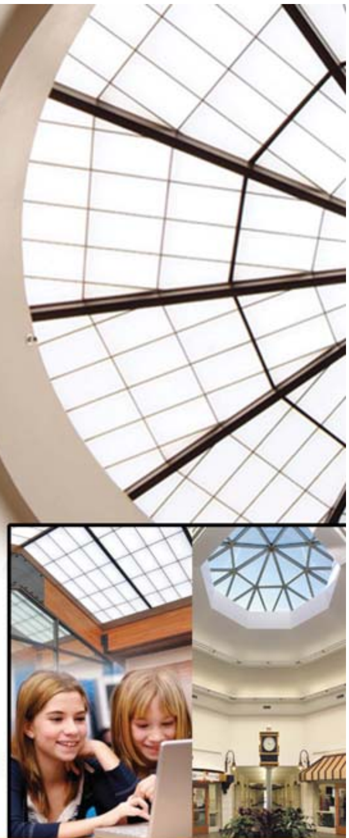
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